

***Environmental Baseline Survey at
North Truro Air Force Station,
Truro, Massachusetts***

Prepared for:

***ACC CEV/ESV
Langley AFB, VA***

and

***U.S. Army Corps of Engineers
Omaha District***

***Final
November 1994***

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ENVIRONMENTAL BASELINE SURVEY AT
NORTH TRURO AIR FORCE STATION
TRURO, MASSACHUSETTS

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EXECUTIVE SUMMARY

Radian Corporation (Radian) was contracted by the U.S. Army Corps of Engineers (USACE), Omaha District, to provide engineering services to support the preparation of an Environmental Baseline Survey (EBS) for North Truro Air Force Station, Cape Cod, Massachusetts, located in Barnstable County, approximately 130 miles southeast of Boston.

The following activities were completed:

- Review of existing information, and compilation into the EBS format;
- A field walkover, to confirm the validity of the existing information; and
- A lead-based paint survey of the family housing area.

In addition to the above activities, a number of areas required by the Air Force EBS format were assessed. The findings and recommendations of the investigation are summarized in Table ES-1.

Based on the investigation, it was judged that the Housing Area should be considered a Category 2 site, since no release, disposal, or migration of hazardous or petroleum products is known to have occurred. The GATR portion of the site, and the Support and Operations Area, should be considered Category 4 sites, since remedial action, where required, has been taken. The FAA is working with the Massachusetts Department of Environmental Protection on the required upgrades of Tank D, adjacent to Building 48 in the Support and Operations Area.

Table ES-1

Summary of Findings and Recommendations

Area	Findings	Actions
Hazardous Substances, Hazardous Materials and Petroleum Products, and Hazardous and Petroleum Waste	One 75-gallon drum at Building 34 contains paint cans, light ballasts, and canned oil collected during the demolition of Tower 49. Eight utility poles believed to be coated with creosote are stored in the parking lot between Buildings 18 and 23. Petroleum product (diesel fuel) is located in Tank D, adjacent to Building 48. Various maintenance chemicals are stored at Building 36. ↑ FAA	Building 34 drummed waste: Ensure proper disposal. Utility poles: Ensure proper disposal. Tank D product: Ensure proper disposition upon closure or tank abandonment. Building 36 materials: At the time of Station closure, determination should be made as to whether these materials are solid or hazardous waste, and the materials should be disposed of accordingly.
Storage Tanks	No aboveground tanks are present. One underground tank (Tank D, adjacent to Building 48) remains. (FAA)	Modify Tank D as required in 40 CFR 280.21 and 529 CMR 9.00. (This issue is being addressed between the Federal Aviation Administration and the Massachusetts Department of Environmental Protection.)
Oil/Water Separators	No evidence found of current or historical presence of oil/water separators at the site.	No action required.
Pesticides	All pesticide/herbicide application by third-party contractors. Associated chemicals not stored or disposed of on site.	No action required.
Medical or Biohazardous Waste	No evidence found of current or historical presence of medical or biohazardous waste at the site.	No action required.
Ordnance	No evidence found of current or historical presence of ordnance use or disposal at the site.	No action required.
Radioactive Waste	No evidence found of current or historical presence of radioactive materials at the site.	No action required.
Solid Waste	Demolition debris from Tower 49 remains stacked on site, near Building 34.	Ensure proper disposal of demolition debris.
Groundwater	Historical analytical data indicates no effect of site activities on groundwater.	No action required.
Drinking Water Quality	Drinking water tested regularly by Barnstable County. No contamination has been detected.	No action required.

Table ES-1

(Continued)

Area	Findings	Actions
Asbestos	<p>All exposed friable ACM have been removed, and all exposed ends protruding from wall have been trimmed and sealed. <u>Friable asbestos remain behind walls</u> throughout the Operations and Support area.</p> <p>Certain nonfriable ACM which were judged unlikely to be released remain on site (e.g., floor tiles, transite siding, heat barrier panels on doors leading to the furnace closets of 100 series houses).</p>	<p>If site activities require disturbance of remaining ACM, manage and dispose of these materials properly. For example, removal and disposal of ACM furnace room door panels in housing buildings would be required, were these doors to be abated for lead.</p>
PCBs	All transformers containing PCBs have been removed from the site.	Label Building 58 transformers as non-PCB.
Radon	No radon testing was performed. Regional information did not indicate excessive levels of radon.	No action required.
Lead-based paint	<p>In the 100 series houses, lead-based paint is present on all exterior siding; exterior upper trim; entry doors, casings, and jambs (interior and exterior); entry enclosures; shed doors and casings; window sashes, sills, and casings (exterior and interior); and phone shelves (3 units tested, all were positive). Two sets of front windows have been replaced on each of Units 102, 104, 106, and 108.</p> <p>In the 200 series houses, lead-based paint is present on exterior upper trim; entry doors, casings, and jambs (interiors and exteriors); and entry enclosures.</p> <p>Exceptions to the above pattern (i.e., isolated surfaces which tested positive) are discussed in Section 3.14.5.</p>	<p>Disclose information on lead paint exceedances to prospective property owners or abate lead-painted surfaces.</p>

a gas station, and a septic tank system/leach field.

- The *family housing area* consisted of 27 housing buildings, a sewage treatment area, and the TELCO building (owned and operated by New England Telephone and Telegraph); and
- The *Ground to Air Transmitter Radio (GATR) site*, located one mile south of the main complex, consisted of a main building, a generator building, a storage building, a pumphouse, and a well. Also located at the GATR site were a 4,000-gallon aboveground fuel storage tank within a concrete diked area, and Tank VV, a 1,000-gallon underground FS-2 fuel storage tank for the heating system.

A map of the site is presented in Figure 1-2. Radar Towers 49, 40, and 30 have been removed, and only foundations remain. Tower 42 has also been removed; its former location is overlain by a parking lot. All GATR structures have been demolished, and all debris has been removed.

The Station consists of an estimated 125.67 acres of government-owned land and 8.53 acres of easements. The main station is located at approximately 42°01'53" North Latitude and 70°03'19" West Longitude. The 1,000-meter Zone 19 Universal Transverse Mercator (UTM) coordinates for the main station are 4653.49 North and 412.61 East. The GATR site is located approximately 1 mile south of the main facility, at Zone 19 UTM 1,000-meter coordinates 4653.49 North and 412.61 East.

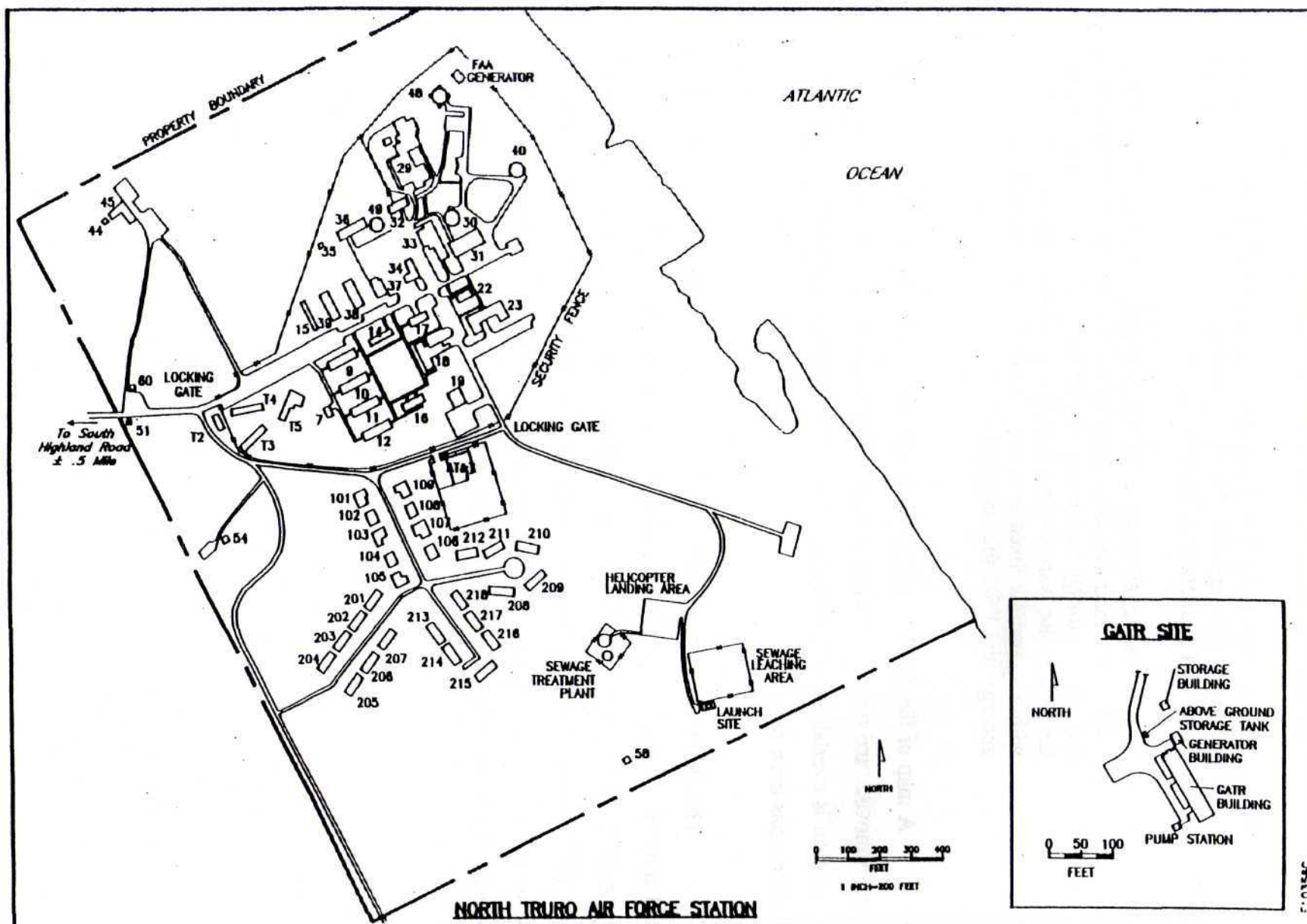


Figure 1-2. Site Plan

2.0 SURVEY METHODOLOGY

2.1 Approach and Rationale

The objective of this project was to prepare an Environmental Baseline Survey (EBS) which would:

- Document the nature, magnitude, and extent of any environmental contamination present at the site;
- Define potential environmental contamination liabilities associated with the site;
- Develop sufficient information to assess the health and safety risks and ensure adequate protection of human health and the environment;
- Determine the possible effects on property value of any contamination discovered; and
- Provide notice, when required under CERCLA, of the storage or release of hazardous substances on the property.

To achieve these objectives, the following activities were completed:

- Review of existing information, and compilation into the EBS format;
- A field walkover, to confirm the validity of the existing information; and
- A lead-based paint survey of the family housing area.

2.2 Description of Documents Reviewed

Significant documents reviewed during the preparation of this EBS are listed in Table 2-1.

Table 2-1

Documents Reviewed During Preparation of the EBS

- "Hazard Evaluation Report, North Truro Air Force Station, Massachusetts," Radian Corporation, November 1987.
- "Sampling Plan, North Truro Air Force Station, Massachusetts," Radian Corporation, May 1988.
- "A-E Safety, Health, and Emergency Response Plan, North Air Force Station, Massachusetts," Radian Corporation, May 1988.
- "Final Analytical Report, North Truro Air Force Station, Massachusetts," Radian Corporation, 17 June 1988.
- "Site-Specific Quality Management Plan, Hazardous Waste Cleanup, North Truro AFS, Massachusetts," Radian Corporation, 29 September 1988.
- Department of the Air Force, AFR 19-2, "Environmental Impact Analysis Process (ELAP)," 10 February 1989.
- "Bidding Information and Specifications, Hazardous Waste Cleanup, North Truro Air Force Station, Massachusetts," Radian Corporation, 14 March 1989.
- "Bid Estimate, Hazardous Waste Cleanup, North Truro Air Force Station, Massachusetts," Radian Corporation, 24 March 1989.
- "Site-Specific Safety Plan Hazardous Waste Cleanup, North Air Force Station, Massachusetts," Radian Corporation, 28 March 1989.
- "Hazardous Waste Cleanup, North Truro Air Force Station, Massachusetts," Drawings DER 14-400E1 through DER 14-400E11, Radian Corporation, DACA45-89-B-0117, May 1989.
- "Specifications (For Construction Contract), Solicitation No. DACA45 89 B 0117, Hazardous Waste Cleanup, North Truro A.F.S., Massachusetts," May 1989.
- The Commonwealth of Massachusetts Letter Re: Notice of Responsibility Confirmed Disposal Site, from Site Support Section, October 18, 1990.
- "Tank Closure Final Report, North Truro Air Force Station, North Truro, Massachusetts," Dennison Environmental, Inc., February 5, 1991.
- "North Truro AFS Preliminary Assessment Report," Radian Corporation, April 1991.
- The Commonwealth of Massachusetts Letter Re: Request for Additional Information, from Site Support Section, June 17, 1991.
- "North Truro AFS Limited Site Investigation Report," Radian Corporation, 9 August 1991.
- The Commonwealth of Massachusetts Letter Re: Response Action Request, from Site Support Section, October 10, 1991.
- Department of the Air Force Station Letter Re: The Commonwealth of Massachusetts Letter dated 10 Oct 91, from Earnest O. Robbins II, Colonel, USAF, Director Environmental Programs, 04 Nov 1991.
- "QA/QC Summary Report for North Truro AFS LSI," Technical Memorandum, Radian Corporation, 13 December 1991.
- The Commonwealth of Massachusetts, Department of Environmental Protection Letter Re: Response Action Request, from Site Support Section, March 17, 1992.
- United State National Park Service, North Atlantic Region, "Hazardous Waste Preliminary Assessment at North Truro Air Force Station," 15 December 1992.
- "Response Action Report, North Truro Air Force Station, Massachusetts," Radian Corporation, February 1993.
- The Commonwealth of Massachusetts, Department of Environmental Protection Letter Re: No Further Remedial Action Required, 23 March 1993.
- Memorandum, from HQ ACC/CEVR, to U.S. Department of the Interior, Re: Environmental Concerns at North Truro AFS, Massachusetts. 14 February 1994.
- Secretary of the Air Force, AFI 32-7066, "Environmental Baseline Surveys in Real Estate Transactions," 25 April 1994.

2.3 Property Inspections

On October 4-5, 1994, personnel from ACC/ESPR, HQ ACC/CEVA, USACE, and Radian attended a project kickoff meeting at the Station, and performed a cursory site walk-through. The lead-based paint survey was performed from October 17 - 21, 1994. The site walkover was conducted the week of October 31 - November 4, 1994.

2.4 Personal Interviews

Personal interviews were conducted with a number of Radian personnel having knowledge of past activities at the site, and with Mr. Hank Hautanen, site caretaker. Mr. Hautanen provided information on the site facilities, past practices, and remedial activities.

2.5 Sampling

During the investigation, painted materials in the housing area were screened for lead content, using the X-Ray Fluorescence (XRF) technique, as described in the document entitled, "Work Plan for an Environmental Baseline Survey/Environmental Assessment at North Truro Air Force Station, North Truro, Massachusetts," (Radian Corporation, 14 October 1994). When necessary to confirm inconclusive XRF results, paint samples were collected and analyzed for total lead, as described in the Work Plan. Four samples of paint were analyzed during the investigation. In addition, a single sample was taken for asbestos analysis; this sample was associated with a heat-barrier panel present on doors leading to the furnace closets in the 100 series houses. This material was tested because the doors tested positive for lead and abatement may require removal and disposal of the heat-barrier panel.

Other than the above-described activities, no sampling was conducted during the EBS investigation. Where relevant, the results of historical sampling efforts are summarized in Section 3.0.

1.0 INTRODUCTION

Radian Corporation (Radian) was contracted by the U.S. Army Corps of Engineers (USACE), Omaha District, to provide engineering services for Air Combat Command (ACC CEV/ESV) at the North Truro Air Force Station, Massachusetts. These services were performed under USACE Indefinite Delivery Contract No. DACA45-93-D-0027. The objective of the work was to prepare this Environmental Baseline Survey (EBS).

1.1 Purpose of the EBS

The purpose of an EBS is to evaluate the environmental "condition of real property or interests in real property to be acquired, disposed, or conveyed as an out-grant."¹ The Air Force requires an EBS for all real estate transactions, with the exception of routine lease renewals and acquisition of explosive quality distance easements². The EBS protects the Air Force by identifying future environmental liabilities when a parcel of real property is acquired, disposed, or conveyed by out-grant.

1.2 Boundaries of the Property and Survey Area

North Truro Air Force Station, Cape Cod, Massachusetts is located off South Highland Road in Barnstable County, approximately 130 miles southeast of Boston, nine miles south of Provincetown, and four miles north of Truro (see Figure 1-1). The Station has been in existence since 1951. When fully operational, the site consisted of three parcels of land (133 acres total):

- The *support and operations area* consisted of approximately 40 buildings, including several radar towers; buildings for operations, civil engineering, library, medical, dining, dormitory and recreational use;

¹HQ USAF/CEV, Draft Air Force Instruction (AFI) 32-7066, "Environmental Baseline Surveys in Real Estate Transactions," 3 November 1993.

²HQ ACC/CEV, Environmental Analysis Branch, ACC Environmental Quality Symposium, "Environmental Baseline Surveys and Environmental Close-Out Surveys," 14-18 February 1984.

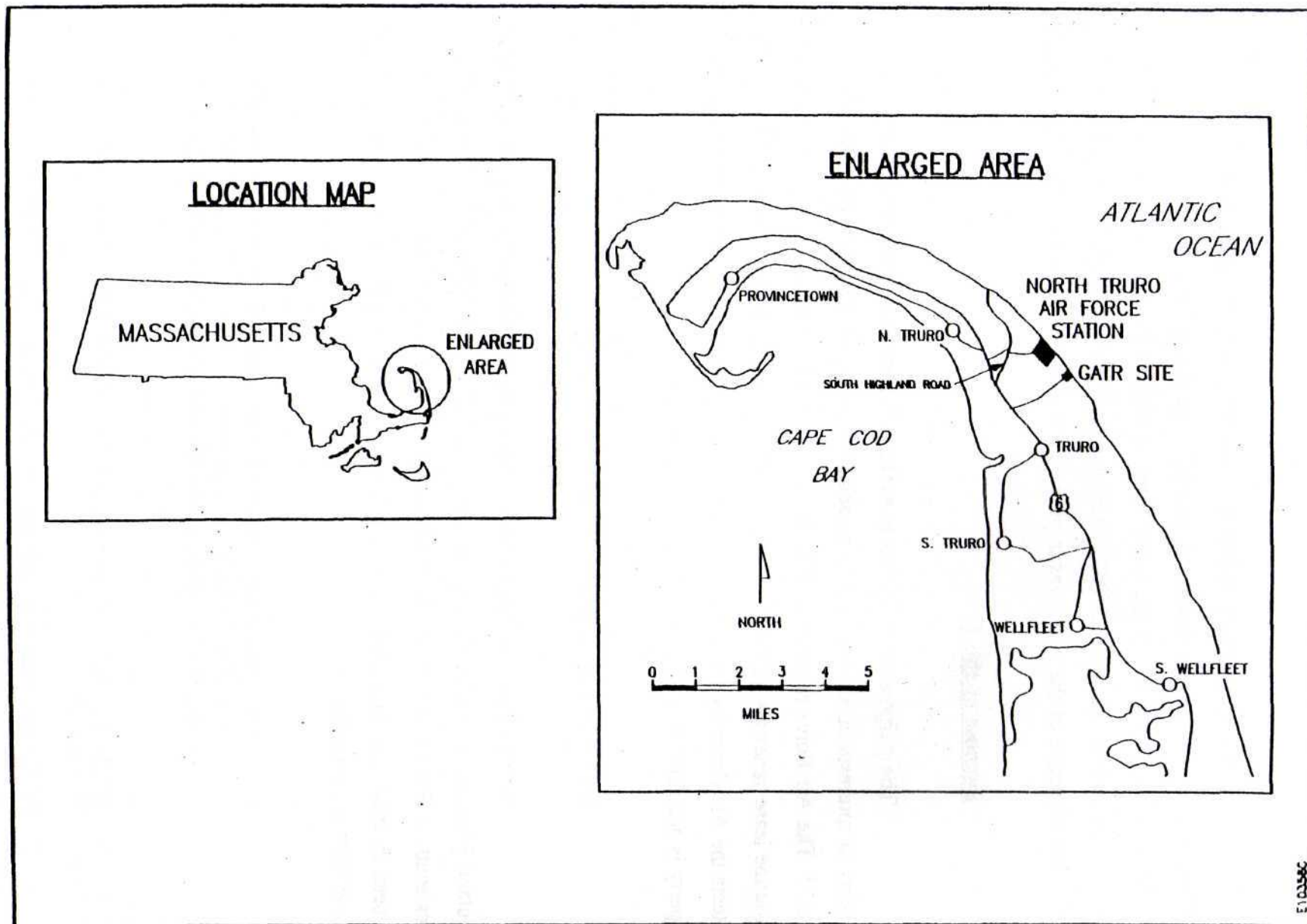


Figure 1-1. Regional Location of Site



Figure 3-1. Site Topographic Map

respectively. Even though the neighboring lenses are in contact, they are hydrologically separated. Fresh water from the lenses discharges radially to the surrounding saltwater and estuaries. The lenses maintain equilibrium between recharge from precipitation and radial discharge. Beneath the North Truro AFS, the flow is to the east, toward the Atlantic Ocean.

The climate is largely controlled by the Atlantic Ocean. Winters are cold, with daily highs in the 30s and 40s, and nightly lows in the 20s and 30s. Daily highs in the summer are in the 70s and 80s. The area receives approximately 48 inches of annual precipitation, mostly in the form of rain.

3.3 Hazardous Substances

During the period when the AFS was fully operational, several routine activities required the use and storage of hazardous substances. However, there is no record of on-site disposal of these materials.

3.3.1 Hazardous Materials and Petroleum Products

Building 36 is currently being used for vehicle maintenance by the facility caretaker. Various maintenance chemicals are stored at this location. At the time of Station closure, determination should be made as to whether these materials are solid or hazardous waste, and the materials should be disposed of accordingly. Petroleum product (diesel fuel) remains in Tank D, adjacent to Building 48. Upon closure or tank abandonment, this material should be disposed of properly.

3.3.2 Hazardous and Petroleum Waste

Table 3-1 describes the locations on-site where hazardous wastes were historically generated. Due to the limited size of the facility and scope of the mission at the Station, the quantity of hazardous waste generated was very small. There is no record of on-site disposal of hazardous wastes, and no recorded spills or releases of hazardous waste

Table 3-1

Historical Hazardous Waste Generators

Location	Description
Maintenance Shop (Building 35)	Storage locker for tools and pre-mixed paint. Exterior and interior painting were done by third-party contractors, so no paint mixing was required, and no wastes were generated. Wash and rinse waters from painting-equipment cleaning were processed through the sewage treatment plant. Turpentine and paint thinner were stored in one-gallon cans for cleaning purposes.
Motor Pool (Building 37)	Oil changes produced waste oil, which was transferred in small containers or 55-gallon drums to the used oil tank adjacent to the Power Plant. Anti-freeze (nonhazardous), stored in a 55-gallon drum, was also required for vehicle maintenance. In addition, solvent was used for cleaning motors and electronic equipment. Trichloroethylene (TCE), the primary solvent, was kept in one-gallon cans in a storage locker.
Power Plant (Building 31)	Seven diesel generators were used until January 1981, and maintained in auxiliary standby status thereafter. Waste oil was piped to the waste oil tank, which was periodically emptied by a contractor and disposed of off-site. A wash sink was also piped to the waste oil tank. Antifreeze, stored in 55-gallon drums, was required for routine maintenance.
Heating Plant (Building 19)	Caustic soda, sodium metaphosphate, and quebracho tannin were used for boiler water treatment. Soot was periodically cleaned from the boiler tubes and disposed of with other solid wastes.
Radar Towers (Buildings 30, 40, 48, 49)	Small quantities of solvents, paint thinner, and other chemicals were used for equipment maintenance, and stored in fireproof lockers.
Water Control Building (Building 7)	Storage of chlorine gas cylinders.
Sewage Treatment Plant	Storage of chlorine crystals.

throughout the history of the facility. Off-site disposal of hazardous waste was accomplished through a third-party contractor. Household garbage generated by the Station was disposed of at the Town of Truro landfill through a third-party contractor. All pesticide and herbicide application was performed by a third-party contractor; therefore, no wastes associated with these activities were stored or disposed of on-site. When the 762nd Radar Squadron was deactivated in the summer of 1985, all excess supplies were transferred to the Defense Reutilization and Marketing Office (DRMO) at Fort Devens, Massachusetts.

Currently, eight utility poles believed to be coated with creosote are awaiting disposal. These poles are presently stacked between Buildings 18 and 23. During the demolition of Building 49, various containerized materials, including paint cans, light ballasts, and oil, were transferred into Building 34, where they are presently being stored within a 75-gallon drum. These materials are also awaiting disposal.

3.4 Installation Restoration Program Contamination

Project correspondence (18) indicated that the Air Force contracted the U.S. Army Corps of Engineers to complete the Preliminary Assessment/Site Investigation Phase of the Installation Restoration Program (IRP) for North Truro AFS IRP sites ST-02, ST-03, and ST-04. Per correspondence with Mr. Robert Zaruba, these sites corresponded to three locations of soil contamination (Tank C and Area G, discussed in Section 3.5.2, and Area H, discussed in Section 3.5.4). No further remediation is required at these sites.

3.5 Storage Tanks

3.5.1 Aboveground Storage Tanks

The Tank Closure Report completed by Dennison Environmental, Inc. (13), indicates that an aboveground fuel oil storage tank was removed during the site cleanup activities of 1990. Per Mr. Hautanen, site caretaker, this tank had been located at the GATR site. No aboveground storage tanks are currently present at the site.

3.5.2

Underground Storage Tanks

There were a total of 49 underground storage tanks (USTs) at the Station; 19 in the Support Area, 29 in the Housing Area, and 1 at the GATR site (listed in Table 3-2 and shown in Figures 3-2 through 3-4). During the period of operation, tanks contained various grades of fuels (diesel, gasoline, furnace oil, etc.) and waste oils. All tanks were asphalt-coated carbon steel. No secondary containment or overfill protection was provided for the tanks since, at the time of installation, these technologies were not commonly used or required.

A total of 47 tanks were removed from the site by Dennison Environmental, Inc., Woburn, Massachusetts, in May-June 1990. The complete results of the UST removal effort are documented in the Tank Closure Final Report (13). Visibly stained soil was removed from around Tanks C, E, F, G, H, L, O, and VV by Dennison, and delivered to an appropriately licensed disposal facility. The excavation sites were screened for contamination by headspace analysis using an HNu Photoionization Detector. This screening indicated that contaminated soil remained at Tank C and Tank VV. An additional tank, Tank S, located adjacent to the TELCO Building in the Housing Area, was owned and operated by New England Telephone and Telegraph. According to Mr. Hautanen, New England Telephone and Telegraph contracted Clean Harbors Inc., to remove this tank in the 1980s. Evidence of this tank removal was visually confirmed by USACE, ACC CEV/ESV, and Radian personnel on 22 November 1994.

At Tank C, Total Petroleum Hydrocarbon (TPH) concentrations up to 400 ppm and volatile organic compound (VOC) concentrations up to 20 ppm were detected in the soil surrounding the tank. The surrounding soil was excavated to a depth of approximately 10 feet. The proximity of the adjacent buildings prevented further excavation. A soil boring completed at the site during March 1991 confirmed the original findings: petroleum hydrocarbons were present in the soils to a depth of approximately 30 feet below ground level (BGL), but were not present in the 35- or 40-foot BGL samples. The document entitled "Limited Site Investigation Report," (16) concluded that there was little chance of

Table 3-2**UST Inventory**

Tank ID	Location	Contents	Capacity	Status
A	N of Bldg 45	#2 Fuel	2,000	Removed
B	N of Bldg 36	#2 Fuel	2-500	Removed
C	S of Bldg 47	#2 Fuel	500	Removed
D	Adjacent to Bldg 48	Diesel Fuel	2,000	Remains on site, used to power FAA generator. Tank does not comply with current UST upgrade requirements.
E	E of Bldg 31	Diesel Fuel	20,000	Removed
F	E of Bldg 31	Diesel Fuel	20,000	Removed
G	E of Bldg 31	Diesel Fuel	40,000	Removed
H	SE of Bldg 31	Diesel Fuel	25,000	Removed
I	SW of Bldg 31	Diesel Fuel	8,500	Removed
J	SW of Bldg 31	Used Lube Fuel	8,500	Removed
K	SE of Bldg 37	Gasoline	4,000	Removed
L	S of Bldg 19	#2 Fuel	25,000	Removed
M	SE of Bldg 19	#2 Fuel	25,000	Removed
N	NW of Bldg 7	Gasoline	500	Removed
O	W of Bldg 15	Propane	400	Removed
P	W of Bldg 60	Gasoline	3,000	Removed

Table 3-2

(Continued)

Tank ID	Location	Contents	Capacity	Status
Q	W of Bldg 60	Gasoline	5,000	Removed
R	W of Bldg 60	Gasoline	5,000	Removed
S	Adjacent to TELCO Building, Housing Area	#2 Fuel	1,000	Owned and operated by New England Telephone and Telegraph. Removed.
T-TT (27 tanks)	Housing Area	#2 Fuel	510	Removed
UU	Helicopter Landing Area	Gasoline	1000	Removed
VV	GATR Site	#2 Fuel	1,000	Removed
ZZ	Bldg 44	#2 Fuel	275	Removed

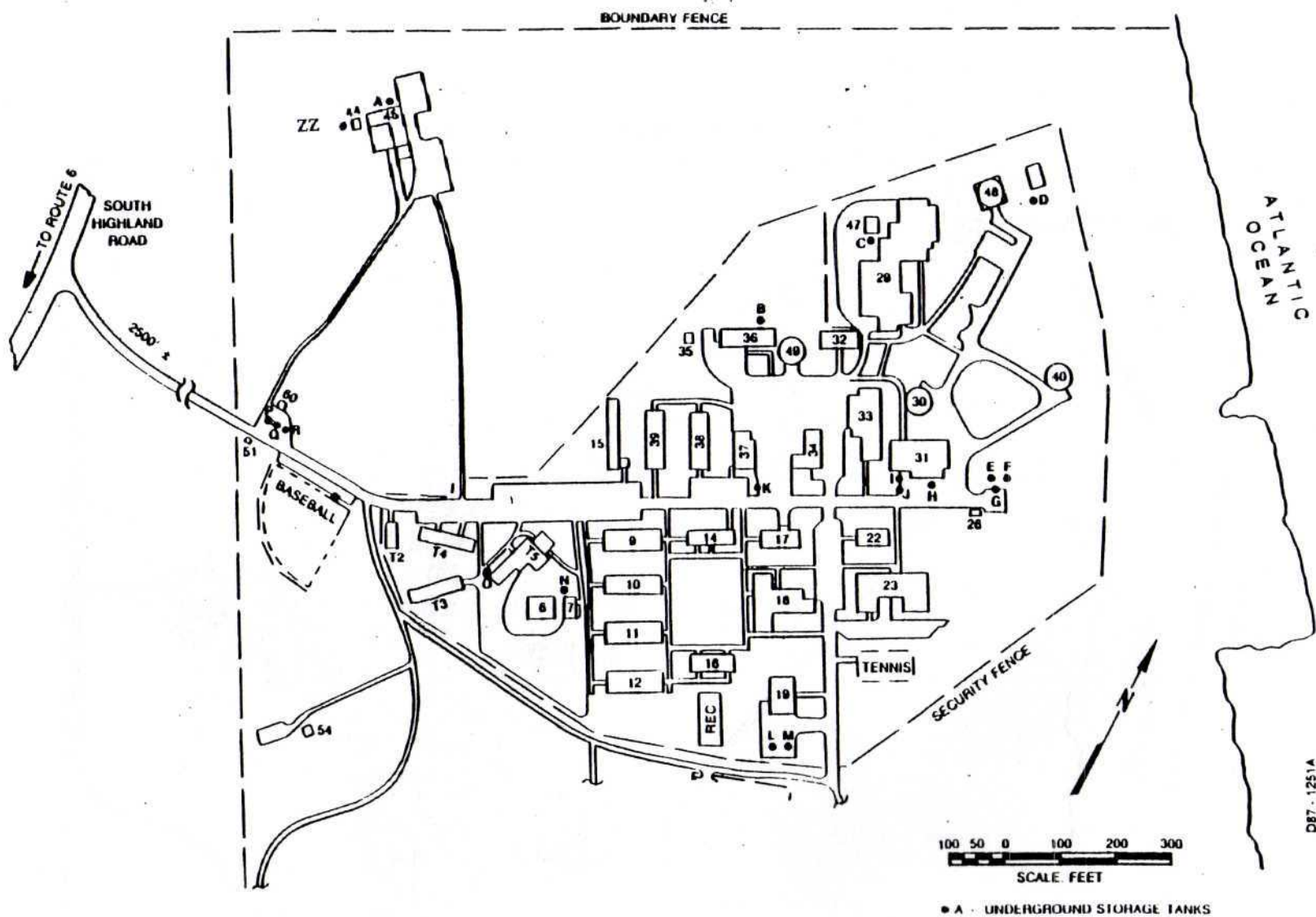


Figure 3-2. Location of Underground Storage Tanks, Support Area

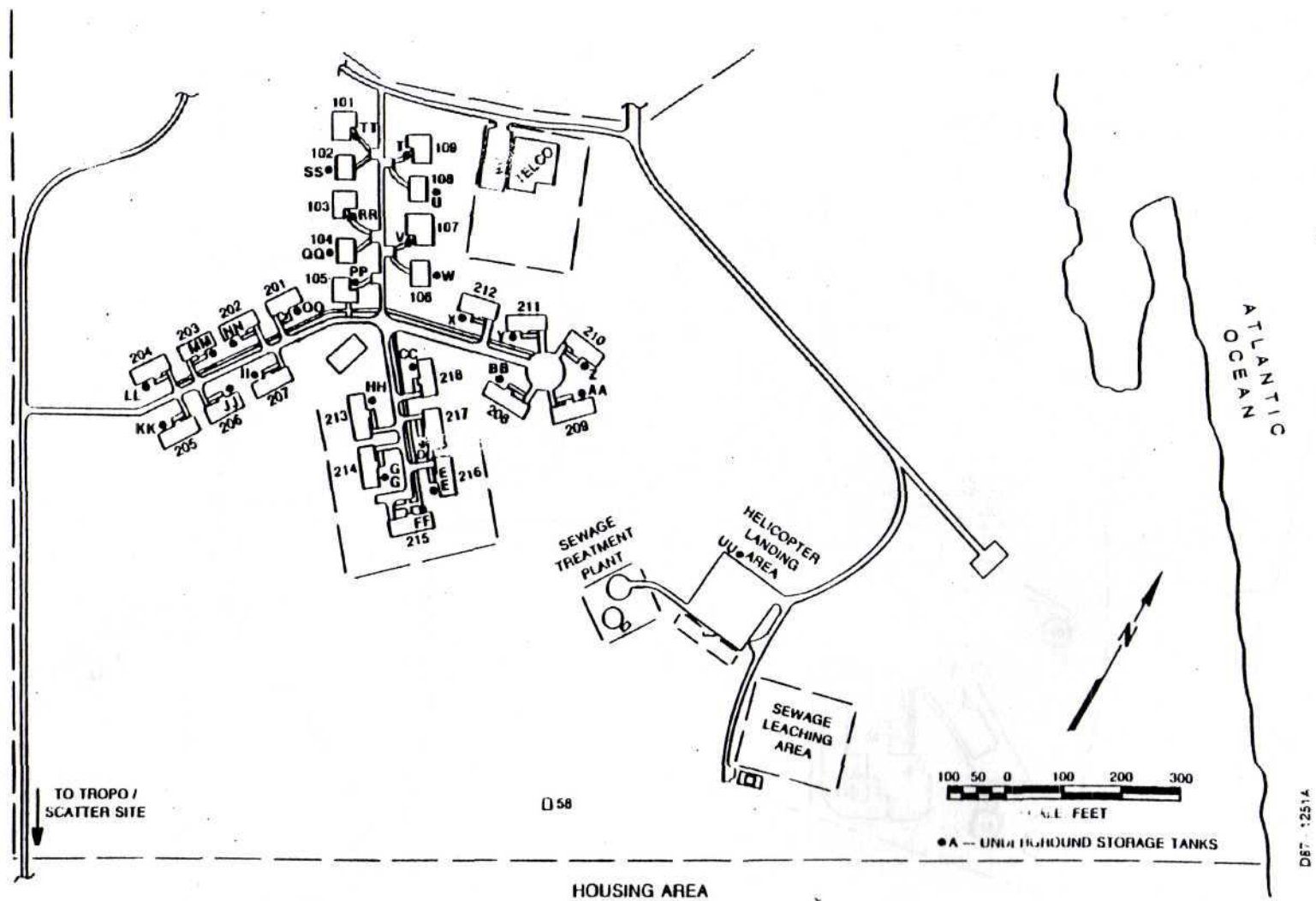


Figure 3-3. Location of Underground Storage Tanks, Housing Area

groundwater degradation at the site, since 1) contamination was found to have only migrated 30 feet into the soil, 2) groundwater depth was greater than 130 feet below land surface at the site, and 3) all surface contamination had been removed. The State of Massachusetts, in a letter of 23 March 1993 (23) concurred that no further remediation was necessary (see Appendix H).

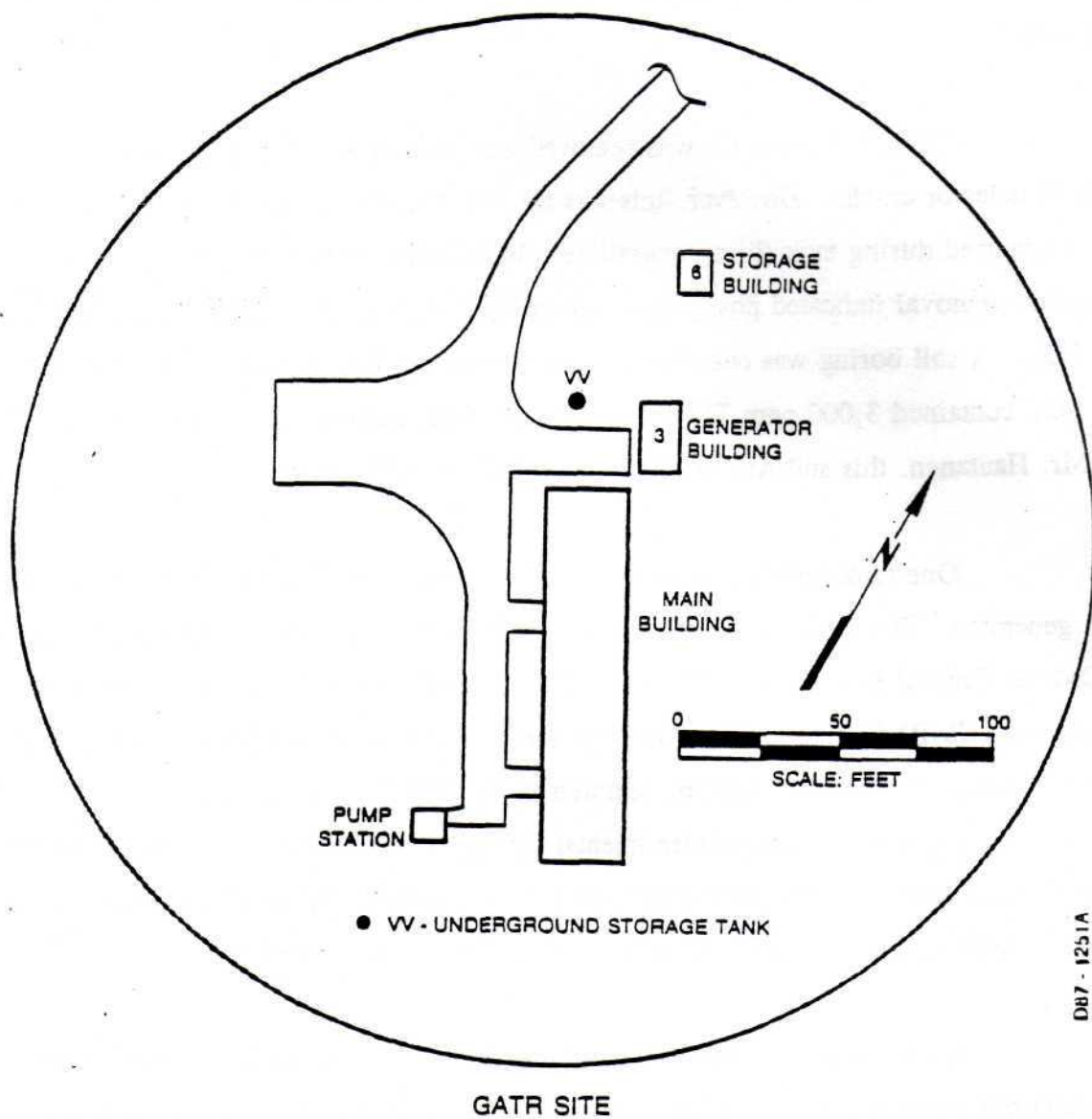
Tank VV (Area G) was removed and found to be in good condition, with no signs of holes or cracks. However, this was the site of a documented spill of No. 2 fuel oil which occurred during tank filling operations. Initial screening of the site by Dennison during the removal indicated possible petroleum hydrocarbon contamination to a depth of 22-feet BGL. A soil boring was completed at the site during March 1991. The sample from 5 feet BGL contained 3,000 ppm TPH; however, no other sample contained measurable TPH. Per Mr. Hautanen, this soil was excavated and replaced with clean fill.

One tank remains on site: Tank D, which stores diesel fuel used to power an FAA generator. This tank does not comply with current UST upgrade requirements in Title 40 Code of Federal Regulations (CFR) Part 280.21 and Title 529 Code of Massachusetts Regulations (CMR) Chapter 9.00. Although there have been no documented releases in the past from this tank, the modifications required in 40 CFR Part 280.21 and 529 CMR 9.00 will ensure that potential future environmental damage is minimized. The Massachusetts Department of Environmental Protection (DEP) has requested that overfill protection (i.e., catch basin) be installed. This issue is being addressed between the FAA and the DEP.

A vent pipe is visible near Building 29; Mr. Hautanen indicated that site personnel had previously excavated this location, and found that the pipe had been severed at the tank, which was no longer present.

3.5.3 Pipeline, Hydrant Fueling, and Transfer Systems

Based on the review of historical documents and the site walkover, no evidence was found to suggest the current or historical presence of pipeline, hydrant fueling,



D87 - 1251A

Figure 3-4. Location of Underground Storage Tanks, GATR Site

or transfer systems at the site.

3.5.4 Contaminated Soil

During the August 1987 site visit, several areas were identified with oil-stained soil. These areas, and the remedial actions taken, are described in Table 3-3, and shown in Figure 3-5. Following the remedial activities described in the Table, the Massachusetts Department of Environmental Protection (DEP) requested the following additional activities related to soil contamination:

- Test and remove additional contaminated soil identified in Area E during the remedial activities;
- Test soil underlying catch basin between Buildings 37 and 38 for VOCs; and
- Install monitoring wells on the immediate east side of the sewage treatment system/leach field and test samples for VOCs.

The results of the Response Action, as detailed in the Radian report of 5 February 1993 (22), were:

- Approximately 9 cubic yards of soil were excavated from Area E. In confirmation sampling, only two samples contained measurable TPH, and these at levels very near the detection limit;
- The soil sample collected from the pervious bottom of the catch basin contained no detectable volatile organic compounds; and
- Soil results from a soil boring installed east of the leach field indicated that soil had not been affected by VOC compounds.

A DEP letter of March 23, 1993 (see Appendix H), indicated that no further remedial response action was required at the site.

Contaminated soil associated with storage tanks is discussed in Section 3.5.2.

Table 3-3
Contaminated Soil Areas

Area	Location	Dimensions	Depth (ft)	Max TPH Results (ppm)	Max PCB Results (ppm)	Comments
B	Near Building 48 (North side of building)	10 ft. dia. circle	6	8,200	0.40	Area may have been used to drain oils containing PCBs. Site cleanup performed in June 1990 by Dennison Environmental.
E (N portion) (E1)	East of Building 40 (former radar tower), near perimeter fence	5 ft. square	2	15,000	Not detected	Stained with oils of unknown origin. Site cleanup performed in June 1990 by Dennison.
E (S portion) (E2)	East of Building 40 (former radar tower), near perimeter fence	5 x 15 feet	2	--	--	Stained with oils of unknown origin. Site cleanup performed in June 1990 by Dennison.
F	East of Building 40 (former radar tower), near perimeter fence	5 x 70 feet	2	10,000	Not detected	Stained with oils of unknown origin. Site cleanup performed in June 1990 by Dennison.
H	West of Building 37 (Motor Pool), near stormwater outfall	5 x 10 feet	2	1,800	3.51	Stained with motor oil spilled during routine vehicle maintenance. Cleanup completed by Dennison in October 1990.
G	GATR Site	5 ft. dia. circle	5	3,000	--	Site of a documented spill of No. 2 fuel oil which occurred during tank filling operations. Per Mr. Hautanen, excavated and replaced with clean fill

-- No analytical data

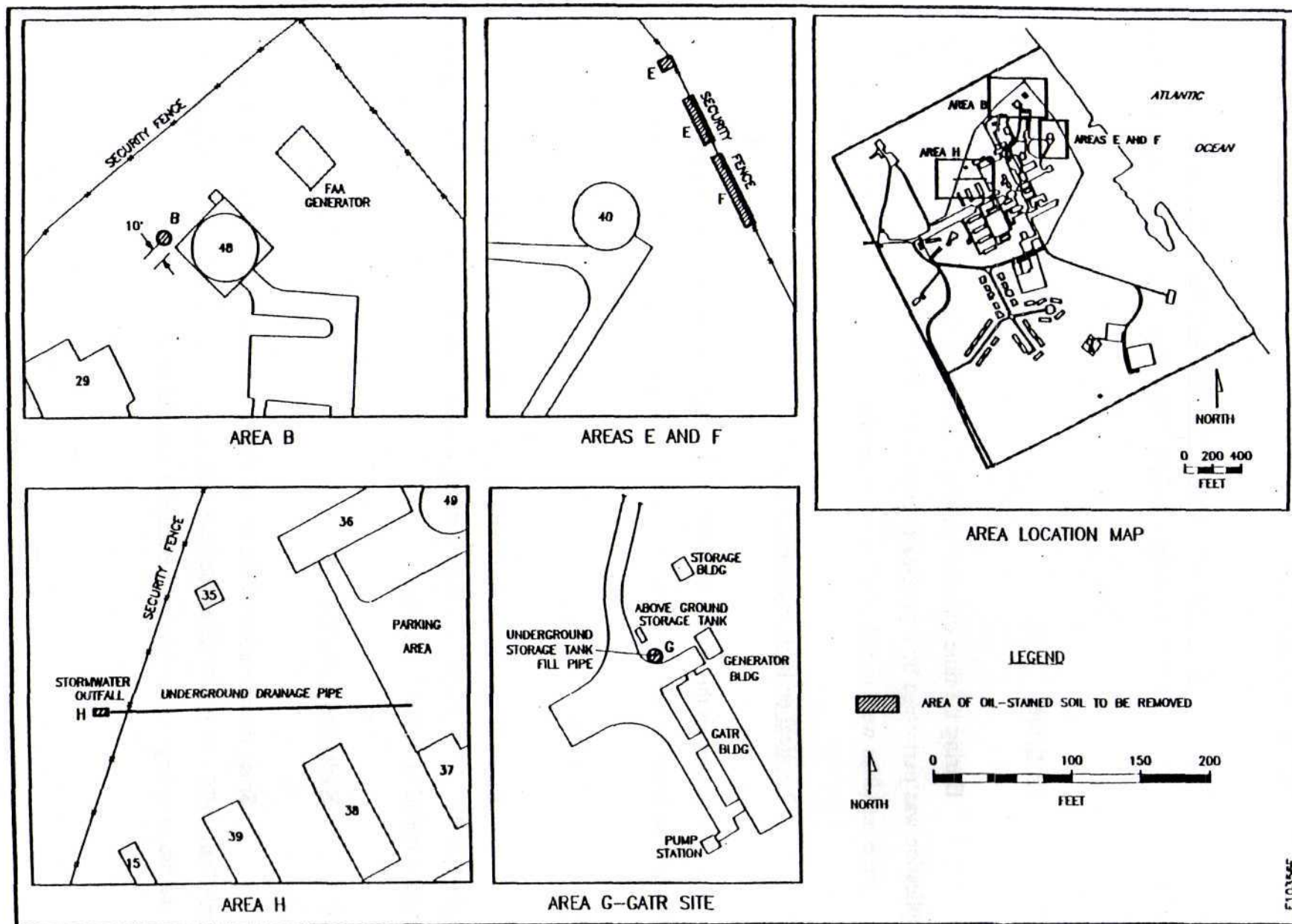


Figure 3-5. Location of Oil-Stained Soils

3.6 Oil/Water Separators

Based on the review of historical documents and the site walkover, no evidence was found to suggest the current or historical presence of oil/water separators at the site.

3.7 Pesticides

During the time that the site was fully operational, all pesticide and herbicide application was performed by a third-party contractor. Therefore, no chemicals associated with these activities were stored or disposed of on-site.

3.8 Medical or Biohazardous Waste

Based on the review of historical documents and the site walkover, no evidence was found to suggest the current or historical presence of medical waste at the site.

3.9 Ordnance

Based on the review of historical documents and the site walkover, and considering the historical mission of the site, no evidence was found to suggest the current or historical use of ordnance at the site.

3.10 Radioactive Wastes

Since the activation of the 762nd Radar Squadron in 1951, the mission of North Truro AFS was that of an air defense radar site. As such, there was no requirement for the use or storage of any type of radioactive material on-site.

3.11 Solid Waste

When the site was fully operational, household garbage generated by the Station was disposed of at the Town of Truro landfill through third-party contractor.

Demolition debris from Tower 49 remains stacked on site, near Building 34. Arrangements are being made for disposal of these debris.

3.12 Groundwater

3.12.1 Well Locations

A summary of wells present at the site is presented in Table 3-4. Four operable water supply wells remain on the site. Two of these (Wells #4 and #5) currently serve Provincetown with a portion of its domestic water supply (approximately 10-13 million gallons/month) during only the summer months (May through September). The other two operable wells are located in Building 48 (for FAA use) and Building 36 (caretaker use).

A water supply well located at the GATR site is abandoned (i.e., the pump and wellhouse have been removed, and the cap has been welded shut). Four abandoned water supply wells are located in a wooded area west of the site, along a southwest-trending line between the site and the Central School. These wells were installed by the Air Force on an easement and at one time supplied the Air Force Station. When these were deemed insufficient to meet the water supply needs of the Housing Area, they were welded shut and covered with concrete.

In addition, in response to Massachusetts DEP concerns that the sewage treatment plant may have impacted groundwater quality, a monitoring well was installed east of the former sewage treatment leaching field. This well is still operable; historical analytical results from this well are discussed in Section 3.12.2, below.

Table 3-4

Well Construction Data

Well Location	Diameter (inches)	Screen Length (ft)	Total Depth (ft)	Comments
Building 36	4	7	178	Operable. Caretaker/maintenance uses.
Building 48	4	7	230	Operable. FAA uses.
Building 54 (#4)	12	15.3	172.3	Operable. City of Provincetown uses.
Building 58 (#5)	8	20	145	Operable. City of Provincetown uses.
GATR	6	Unknown	184	Abandoned.
Easement Wells (4) Located on easement southwest of site.	Unknown	Unknown	Unknown	Abandoned.
Monitoring Well (east of former sewage treatment leach field).	2	15.04	143.88	Operable.

3.12.2 Groundwater Quality

Well #5 is tested on a monthly basis by the Barnstable County Health and Environmental Department, for total coliform bacteria, pH, specific conductance, iron, nitrate, and sodium. No contamination has ever been detected (1). As a supplement to this routine testing, the County collected samples for more extensive analysis from Well #5 in September 1987, and from all other on-site wells in November, 1987. The following analyses were performed:

- Standard drinking water parameters (including alkalinity, turbidity, color, hardness, manganese, and background bacteria, in addition to the monthly parameters listed above);
- EPA Method 601 -- Purgeable Halocarbons;
- EPA Method 602 -- Purgeable Aromatics; and
- EPA Method 608 -- PCBs.

All standard drinking water parameters, with the exception of manganese, sodium, and nitrate, were within the established acceptance ranges. No parameter listed in EPA Methods 601, 602, and 608 was present at a level above the analytical detection limits of 1.0 ppb. (The detection limit for Well #5 samples was 0.5 ppb). The lab reports for these samples were presented in Appendix C of the "Hazard Evaluation Report, North Truro AFS," (Radian, November 1987).

During the Response Action (1993), four on-site water supply wells were purged and sampled for VOCs. No VOCs were detected in samples collected from the wells in Buildings 36, 48, or 58. The sample from the well in Building 54 contained chloroform (which was also detected in the laboratory method blank, suggesting that laboratory contamination was the source) and trichloroethene (at a level equal to the detection limit). The actual presence of trichloroethene in the sample was considered suspect.

In addition, the monitoring well installed east of the former sewage treatment leaching field was sampled; results indicated that groundwater had not been affected by VOCs.

3.13 Wastewater Treatment, Collection, and Discharge

Domestic wastewater generated from nearly all buildings at the main facility were treated at the on-site sewage treatment plant. Exceptions to this were the GATR Site, and Buildings 40, 45, and 48, which used septic systems. Prior to construction of the sewage treatment plant in 1969, all wastewater was processed through a septic tank system/leach field located southeast of the Housing Area. The sewage treatment plant at the main site was an Eimco Aerobic Digestion Plant, which utilized chlorine crystals in the treatment process. Initially, sludge generated by the plant (approximately 1000 gallons every three months) was hauled off-site by a contractor for proper disposal. By 1979, sludge drying beds (lined with plastic) were installed, into which sludge was pumped from the plant every two months. The treatment plant was rated at 40,000 gallons/day, but was never utilized at full capacity. The maximum quantity of wastewater generated was 33,000 gallons/day in May of 1984. Currently, septic systems are located at Buildings 36, 48, and 49, the Commissary, and the TELCO Building.

3.14 Disclosure Items

3.14.1 Drinking Water Quality

Drinking water quality has been discussed in Section 3.12 (Groundwater).

3.14.2 Asbestos

An asbestos survey and sampling program was conducted in 1987/1988. Exposed friable asbestos-containing materials (ACM) were located and removed, as summarized in Table 3-5. All exposed ends protruding from walls, etc., have been trimmed

Table 3-5

Summary of ACM Materials

Location	Description of Remediated ACM
Building T2 (Chapel)	Steam and condensate lines and fittings, and associated elbows, tees, and valves (insulation).
Building T3 (Storage)	None.
Building T4 (Medical Aid Station)	Crawl space steam and condensate lines and fittings (insulation). Crawl space soil contaminated with asbestos.
Building T5 (Enlisted Men's Club)	Ceiling tile in main room. Steam and condensate return lines and fittings in the paneled room and in the space above the drop-in ceiling (insulation). Crawl space soil contaminated with asbestos.
Buildings 9 - 12 (Dormitories)	Crawl space and first floor pipe and fitting insulation (all dormitories). Crawl space soil contaminated with asbestos. Hot-water tank insulation, all buildings. Ceiling tiles in Building 10 and 11.
Building T14 (Library)	Pipe insulation steam and condensate return lines. Crawl space soil contaminated with asbestos.
Building 15 (Bowling Alley)	Steam and condensate return line (pipes and fittings). No crawl space (slab foundation).
Building 16 (Rec Building)	Steam supply and condensate return. Crawl space soil contaminated with asbestos.
Building 17 (Supply and Issue)	Steam and condensate lines throughout the building (insulation). Ceiling tile in east room.
Building 18 (Dining Hall)	Dining area ceiling tile. Hot water tank (dining room), steam and condensate lines and fittings throughout the building, and the main steam line in cooler room (insulation).
Building 19 (Steam Plant)	The three boilers and flues (insulation). Gaskets on Boilers #1 and #2. Main high-pressure steam header for Boiler #3 (insulation). Selected boiler fittings. 3-4" outside diameter steam pipe in main boiler room, condensate return pump room, and equipment room (insulation). Fittings on 2" outside diameter steam pipe in main boiler room, condensate return pump room, and equipment room (insulation). Upper water tank (insulation). 1" outside diameter pipe fittings in main boiler room (insulation).
Building 22 (Theater)	Steam and condensate return lines and associated fittings (insulation).

Table 3-5
(Continued)

Location	Description of Remediated ACM
Building 23 (Bachelor Officer's Quarters)	ACM-insulated hot-water system in ceiling of first floor hallway (with feeder lines). Steam and condensate return lines (and fittings) in crawl space (insulation). Crawl space soil contaminated with asbestos. Water tank in first-floor center room (insulation).
Building 29 (Operations)	Insulation on all pipes, elbows, tee, and valve coverings (except for freon lines, pipes and fittings in the Mechanical Room, and some pipe insulation near the telephone room). In the east mechanical room, the fresh air duct and the corrugated paneling inside air handling unit.
Building 31 (Power Plant)	Exhaust flues on three generators (insulation). Thermal insulation on 1-2" OD steam and condensate return lines.
Building 32 (Warehouse and Office)	Outside steam supply line (insulation).
Building 33 (Theater and Sentry Station)	Steam and condensate return piping and fittings (insulation).
Building 34 (Storage Area and Fire Station)	Steam and condensate return lines.
Building 36 (Maintenance Shop/Civil Engineering)	Pipe in space above drop ceiling in office area (insulation). Asbestos-contaminated soil beneath discarded pipe stacked on ground near Building 36.
Building 37 (Auto Maintenance Shop)	Steam and condensate return lines.
Building 38 (Dormitory)	Steam and condensate return lines traversing perimeters, two additional lines, and associated fittings. Crawl space soil contaminated with asbestos.
Building 39 (Dormitory)	Steam and condensate return lines traversing perimeters, two additional lines, and associated fittings. Crawl space soil contaminated with asbestos. Ceiling tile on second floor. First floor hot water tank (insulation).
Building 40 (Radar Tower)	Steam and condensate return lines (insulation).
Building 45 (Commissary)	Steam and condensate return lines and fittings in latrine and Mechanical Room (insulation).
Buildings 100 - 109 (Family Housing)	None.

Table 3-5

(Continued)

Location	Description of Remediated ACM
Buildings 201 - 218 (Family Housing)	Gaskets servicing forced air heating units. Hot water pipes and fittings (attics).
GATR Building	Three vibration gaskets on HVAC unit. Flue gasket.
Unnumbered Storage Building (just west of Operations north end)	None
Station-wide	Steam and condensate return lines and fittings which run parallel on elevated supports.

and sealed. Unexposed friable ACM are still present behind walls throughout the site. Certain nonfriable ACM, which were judged unlikely to be released, remain on site. These include floor tiles, transite siding, and heat barrier panels on doors leading to the furnace closets of 100 series houses. The heat barrier panels were identified as being ACM during the site walkover (see Appendix F). If site activities require disturbance of remaining ACM, these materials should be managed and disposed of properly. For example, removal and disposal of ACM furnace room door panels in housing buildings would be required, were these doors to be abated for lead.

3.14.3 Polychlorinated Biphenyls

PCBs in Transformer Oil Oil in transformer switches and transformers represented the primary potential source of PCBs at the facility. A transformer inspection and sampling program was undertaken in 1981 by Burlington Testing Company (Burlington, New Jersey). A total of 70 samples of insulating oil were submitted for evaluation of contamination by PCBs. Twenty-six (26) transformers were found to have oil containing detectable levels of PCBs. An additional transformer containing a detectable level of PCBs was discovered during a survey in August 1987. All 27 transformers with detectable PCBs were reported to have been removed from the site. Known remaining oil-containing equipment at the site is listed in Table 3-6, along with comments on each item. The only action required is that the Building 58 transformers require labeling; historical data indicates that these transformers contain non-PCB oil.

Possible PCB-Contaminated Soil It had been alleged that, when the station was operational, transformer oil containing PCBs may have been regularly dumped at Area B (located on the north side of Building 48). During a site visit in 1987, no visible evidence of dumping (i.e., oil-stained soil) was observed. Soil samples were collected from depths of 1 and 5 feet below grade at the site (in May 1988) and submitted for PCB analysis. No samples had a PCB concentration greater than 1 ppm. Four other areas, which were identified as having oil-stained soils, were sampled and analyzed for PCBs. These areas were B, E, F, and H (discussed in Section 3.5.4). The highest PCB levels detected were

Table 3-6

Remaining Equipment on Air Force Property

Location	Transformer ID	Comment
Building 18	NA	One non-PCB switch.
Building 19	NA	One non-PCB switch.
TELCO Building	NA	One non-PCB switch.
Building 45	NA	One non-PCB switch.
Building 7 (water plant adjacent to north side)	Three ground-based, 15 kVA transformers without serial numbers remain, in addition to one non-PCB switch.	All transformers, and the switch, are labeled non-PCB.
Building 9	#12557, 25 kVA	One transformer and one switch remain, both labeled non-PCB.
Building 17	Three 15 kVA transformers: #C114438 #C218948 #C107439 One switch: #601-71-0426	All labeled non-PCB, and have blue stickers.
Pole, Building 54, Water Supply (pole unmarked)	Three pole-based transformers, 33.3 kVA each, on Pole B-1-6.	All labeled non-PCB, and have blue stickers.
Pole, Building 58, Water Supply	Three transformers on pole B-13.	Not labeled. Historical analytical information indicated non-PCB oil (Burlington data, November 1981).

3.51 ppm and 3.20 ppm for duplicate samples at Area H. Stained soil in these areas was removed by Dennison in 1990.

3.14.4 Radon

No radon testing was performed at the site, and no evidence was found of previous testing. Mr. Sean O'Brien of the Barnstable County Health Department indicated that the Department had radon test records for two buildings in North Truro. Neither test indicated excessive radon levels; results for both tests were less than 4 pCi/L.

3.14.5 Lead-Based Paint

Radian and its subcontractor, American Environmental Services (AES), completed a lead-based paint survey of the site housing area in October 1994. Sampling was conducted as described in the Work Plan. The survey adhered to guidelines for hazard identification and abatement for lead-based paint, developed by the Department of Housing and Urban Development (HUD) and described in the document entitled "Lead-based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing" ILBGP, Revision 3, May 1991. A positive lead determination was considered to be a sample yielding a lead concentration of greater than 1.0 mg Pb/cm². This HUD-based criterion is more stringent than the Massachusetts criterion of greater than 1.2 mg Pb/cm² (as stated in 105 CMR 460).

The nine 100 series houses (built in the 1950s) were fully surveyed. Eight of the eighteen 200 series houses (built in the 1960s) were fully surveyed. In the remaining ten 200 series houses, random samples were taken to confirm the pattern of non-detects established in the previous sampling. Media that frequently yielded positive results were interpreted to be positive for all houses in the series (i.e., 100 series or 200 series). Additionally, media that frequently yielded inconclusive results were assumed to be positive. Chip sampling and sodium sulfite testing were performed on these media, and results supported this conservative decision.

The sampling data for the housing units (Appendix G) is presented in several different formats, including:

- A statistical report listing each component tested and the percentages of positive or negative findings for lead; and
- A frequency distribution report, which provides graphical representations of each component and the distribution of lead results.
- A summary report, which provides only the positive lead hits and their concentrations, by unit tested rather than component tested.
- A detailed report, which lists every shot taken, the location, and the results.
- Field notes, which list every shot taken, a description of the media sampled, the location, results, and assumptions made.

Surfaces which tested positive for lead-based paint in all houses are listed in Table 3-7. Exceptions to the pattern described in Table 3-7 (i.e., isolated surfaces which tested positive) are listed by house in Table 3-8.

The listed surfaces should be abated or full disclosure should be made to the prospective purchaser before property transfer.

Table 3-7

Components with Lead-Based Paint (Surfaces Positive in All Houses)

Series 100 Houses
Exterior siding
Exterior upper trim
Entry doors, casings, and jambs (interior and exterior)
Entry enclosures
Shed doors and casings
Window sashes, sills, and casings (exterior and interior) ^a
Phone shelves (3 units tested, all were positive)
Series 200 Houses
Exterior upper trim
Entry doors, casings, and jambs (interiors and exteriors)
Entry enclosures

^a Two sets of front windows have been replaced on each of Units 102, 104, 106, and 108. These replaced windows do not have lead-based paint; they are recognizable by a groove on the interior sill and a thinner exterior casing.

Table 3-8

Isolated Surfaces Which Tested Positive for Lead-Based Paint^a

Unit	Room	Surface
101	Living room	Louvered door (inconclusive ^b w/ 1.2 confirmation shot, assume +)
	Hall	Louvered door casing (inconclusive w/ 0.4 test shot, assume +)
102	Hall	Bathroom door casing and jamb (inconclusive w/ 1.1 and 0.4 test shots, assume +)
103	--	None
104	Front bedroom	Closet door trim (+)
	Rear bedroom	Room baseboards (inconclusive w/ 1.2 test shot, assume +) Hall door casing (inconclusive w/ 1.2 test shot, assume +) Closet walls (inconclusive w/ 0.4 screen shot, assume +) Closet baseboards (inconclusive w/ 0.9 test shot, assume +)
	Hall	Baseboards (inconclusive w/ 0.7 test shot, assume +) Furnace closet doors (+) Furnace closet door casing and jamb (inconclusive w/ 0.9 test shot, assume +)
	Kitchen	Baseboards (inconclusive w/ 0.9 test shot, assume +) Louvered door and door casing (+)
	Bathroom	Lower shelves (inconclusive w/ 0.4 screen shot, assume +)
105	Hall	Baseboards (inconclusive w/ 0.7 screen shot, assume +)
106	Front left bedroom	Baseboards (inconclusive w/ 0.9 screen shot, assume +)
	Hall	Furnace closet doors (inconclusive w/ 1.1 confirmation shot, assume +) Furnace closet door casing (+)
	Kitchen	Water heater cabinets (+)
107	Living Room	Baseboards (inconclusive w/ 1.3 test, assume +)
	Hall	Furnace closet doors (inconclusive w/ 0.9 confirmation shot, assume +) Louvered door (inconclusive w/ 1.1 confirmation shot, assume +)
	Bathroom	Hall door casing (inconclusive w/ 0.9 confirmation shot, assume +) Cabinet doors (inconclusive w/ 0.9 confirmed shot, assume +)
	Kitchen	Living room door casing (inconclusive w/ 1.0 confirmed shot, assume +) Water heater cabinets (+)

Table 3-8

(Continued)

Unit	Room	Surface
108	Living room	Baseboards (inconclusive w/ 0.9 confirmation shot, assume +)
	Front bedroom	Hall door casing (inconclusive w/ 0.9 confirmation shot, assume +)
	Rear bedroom	Closet door trim (inconclusive w/ 1.2 confirmed shot, assume +)
	Hall	Baseboards (inconclusive w/ 1.0 confirmed shot, assume +) Closet door trim (+) Furnace closet doors and trim (+) Door casings into other rooms (+)
	Bathroom	Cabinet doors (inconclusive w/ 0.9 confirmed shot, assume +)
	Kitchen	Water heater cabinets (+)
109	Bathroom	Hall door casing/jamb (inconclusive w/ 1.3 test shot, assume +) Cabinets (inconclusive w/ 1.1 confirmed shot, assume +)
	Hall	Furnace closet casing/jamb (+) Louvered door (+)
201-210, 212-218	--	None
211	Hall	Wall (inconclusive w/ 0.5 screen shot, assume + or retest)

^a Units are mg Pb/cm²

^b Inconclusive ranges based on the following equipment accuracy (mg Pb/cm²):

Screen: 1.0 ± 0.6, inconclusive range 0.4-1.6
 Test: 1.0 ± 0.3, inconclusive range 0.7-1.3
 Conclusive: 1.0 ± 0.15, inconclusive range 0.8-1.2